ACT-IR100S
Intelligent IrDA Serial Adapter

User's Manual

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Rev. 1.10
March 14, 2000

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FCC & VCCI Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1)This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
WARNING-FCC Regulations state that any unauthorized changes or modifications to this equipment not expressly approved by the manufacturer could void the user authority to operate this equipment

NOTE: This equipment has been tested and found to comply with the limits for Class B digital device, pursuant to Part 15 of the FCC Rules. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will nor occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Increase the separation between the equipment and receiver.
-Reorient or relocate the receiving antenna.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

This equipment is in the 2nd Class category (information equipment to be used in a residential area there to) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in such residential area. When used near a radio or TV receiver, it may become the cause of radio interference. Read the instructions for correct handling.

NOTE: Must be used with shielded cable only.

FOR YOU RECORDS.....
For your assistance in reporting this product in case of loss or theft, please record below the model number and serial which are located on the bottom of the case. Please retain this information.

Model Number	Serial Number
Date of Purchase	Place of Purchase

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TABLE OF CONTENTS

PRECAUTIONS 3

Operation Settings 4

Part 1: Function mode Settings (R11 ~ R18) 4

Item 1 IrDA Operation Mode Settings 5

Item 2 RS-232C Communication Speed Settings 5

Part 2: LED Indicator Function 6

Part 3: Connector 6

Part 4: How to connect 7

GENERAL SPECIFICATION 9

APPENDIX A: ACTiSYS IR100S Testing/Demonstration Procedure 10

APPENDIX B: Using IR100S to Convert a Modem to a wireless IrDA Modem . 15

OTHER ACTiSYS IrDA PRODUCTS 20

LIMITED WARRANTY 21

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PRECAUTIONS

To ensure trouble-free operation, please observe the following precautions:

Optical communications are easily affected by external light sources, weak batteries, transfer distance, transfer angle, etc.

Any of these conditions may cause a data transfer failure, incomplete, missing or incorrect data. Make sure that the wireless interface is away from direct sunlight and other strong light source.

- Do not terminate arbitrarily during file transfer process between DUT and computers until finished. Otherwise DUT internal data integrity may be damaged, which is due to the violation of DUT's.
- Do not expose the unit to moisture, as this will damage the internal circuitry.
- Do not expose the unit to extreme temperatures. It should not be placed in direct sunlight or in a closed vehicle, neither should it be placed near heaters nor other heat sources.
- Do not store the unit in a humid or dusty place.
- Use a soft, dry cloth to clean the unit. Do not use a wet cloth or any solvent.
- Do not drop the unit or handle the unit carelessly.

CAUTION:

- Never touch the pins of computer connection terminal. The internal circuits can be damaged by a static electricity discharge. If this device requires any servicing, use only an ACTiSYS service dealer, an ACTiSYS approved service facility, or an ACTiSYS repair service.
- When exchanging data with host computer, be sure the appropriate serial communication port is available and is not in conflict with other peripheral device or software.

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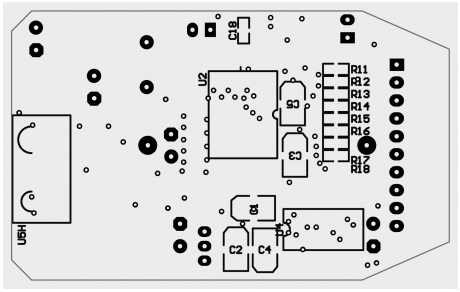
OPERATION SETTINGS

Part 1: Functional mode Settings (R11 ~ R18)

Here the settings for the R11 ~ R18 are displayed. When power is thrown for any resistor besides R13~R15, they will be sampled at the time NMI is reinstated. After that, there will be no problems with operation even if the settings are changed; however the settings will become invalid.

PCB bottom view



** R11 ~ R18 --
1: None
0: Install 0 **R** (0603)

R11 R12 R13 R14 R15 R16 R17 R18 R: Initial Setting

Data Length (R18)

1	8 bit ※
0	7 bit

Parity (R17)

1	None ※
0	Even

Control Line Extension Mode (R16)

	Serial Settings (bps, data length, parity)	Condition for starting discovery (primary channel) Condition for permission to Connect (secondary channel)
1	Self channel R13~R15 Settings	When DSR : ON, CTS : ON ※
0	Settings from partner channel	---

RS-232C Communication Speed Setting (R13,R14,R15)

0 0 0	9600 bps
1 0 0	19200 bps
0 1 0	38400 bps
1 1 0	57600 bps
0 0 1	115200 bps ※

IrDA operation mode configuration (R11,R12)

0 0	Reserver
1 0	primary channel
0 1	secondary channel
1 1	primary / secondary ※

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Item 1: IrDA Operational Mode Settings

It is possible to select the primary channel mode, secondary channel mode, and the primary channel as well as the secondary channel according to the settings of R11 and R12.

Operation mode	mode setting terminal	
	R11	R12
Reservation	0R	0R
primary channel	▪	0R
secondary channel	0R	▪
Primary / secondary channel	▪	▪

Item 2: RS-232C Communication Speed Settings

It is possible to set the RS-232C communication speed with R13, R14, and R15.

However when the control line extension mode of R16 is not installed, the settings will be valid for all self-channels. But, when it is 0R, if the R11 and R12's IrDA mode setting is primary or primary / secondary channel, then the self-channel with be valid. If it is set to the secondary channel, regardless of the communication speed setting, the other device will set the communication speed. (Figure 2-2).

When the communication rate has established an IrDA link, it will be sampled, so it is okay to change the speed settings while it is in operation. In the event that the speed is changed while communicating, the current communication link will be severed and with any following communication the new speed will become valid.

Figure 2-1

Communication Speed	Communication Speed Setting Terminal		
	R13	R14	R15
9600bps	0R	0R	0R
19200bps	▪	0R	0R
38400bps	0R	▪	0R
57600bps	▪	▪	0R
115200bps	0R	0R	▪

Figure 2-2

R16	Primary Channel R12:0R , R11: ▪	Secondary Channel R12: ▪ , R11:0R	Primary / Secondary Channel R12: ▪ , R11: ▪
▪	self channel	self channel	self channel
0R	self channel	other channel	self channel

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Part 2: LED Indicator Function

In order to confirm that the device is operating correctly there is an indicate function installed.

By looking at the flash of the LED you can check the state of communication.

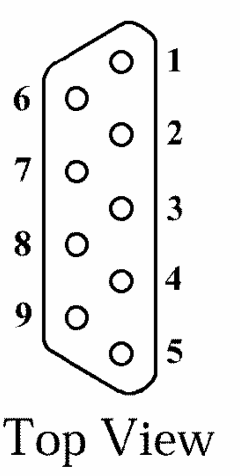
There are 2 flashing speeds, during standby on the secondary channel there is no flashing. If the primary channel commences discovery, it will flash once every 3 seconds (for approx. 0.7 seconds). After discovering the other device and communication becomes possible it will flash every 0.4 seconds.

Operating condition	LED	
during connection standby	Low	
during discovery	low speed flashing	flashing once every 3 seconds (for approx. 0.7 seconds)
during communication with other device	high speed flashing	switches from High to Low every 0.4 seconds

Part 3: Connector

D-sub 9-pin Male connector: (RS-232C)

Pin No.	Name	Descriptions	I/O
1	DCD	Data Carrier Detect	I
2	RxD	Receiver Data	I
3	TxD	Transmitter Data	O
4	DTR	Data Terminal Ready	O
5	GND	Signal Ground	Gnd
6	DSR	Data Set Ready	I
7	RTS	Request to Send	O
8	CTS	Clear to Send	I
9	RI	Ring Indicator	I



*** Electricity source:

a) With Voltage Regulator
(U6_ is placed, R25 is removed)
AC Adaptor DC 7.5V / 300mA above

b) Without Voltage Regulator
(U6_ is removed, R25 is placed)
DC 5V / 450mA above, stable source.

+ DC 5V
Gnd

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Part 4: How to connect

- Serial Port: When connecting modems etc. to the Data Communication Equipment (DCE) side, connect the corresponding signal names of the modem and IR100S+. When connecting to PC's to the Data Terminal Equipment (DTE) side use a cross connection for IR100S+ and the PC or Plotter/Printer(with RS232 port).

Example Connection Reference #1: Modem (DCE) Connection

IR100S+ I/F	< Straight Cable >	Modem(DCE)
RxD (RD) ◄	RxD : (RD)	Data Receiving Only valid with received data when the DCD (CD) signal is on.
TxD (SD) ►	TxD : (SD)	Data Transmission Valid with sending data when RTS (RS), CTS (CS), DSR (DR), DTR (ER) are on.
/DTR (ER) ►	/DTR: (ER)	Data Terminal Ready Turns on when receiving and transmitting of data is possible and when the terminal has power.
/DSR (DR) ◄	/DSR: (DR)	Data set ready Turns ON when the modem is able to send and receive.
/RTS (RS) ►	/RTS: (RS)	Transmission Request Instructs the modem to be in transmission mode. The terminal is turned on before the transmission.
/CTS (CS) ◄	/CTS: (CS)	Transmissible Indicates that the modem is able to transmit. When CS is ON the modem is able to receive.

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Example Connection Reference #2: PC Terminal (DTE) Connection

IR100S+ I/F	< Cross Cable >	PC Terminal(DTE)
RxD (RD)	RxD (RD)	: Data Receiving Only valid with received data when the DCD (CD) signal is on.
TxD (SD)	TxD (SD)	: Data Transmission Valid with sending data when RTS (RS), CTS (CS), DSR (DR), DTR (ER) are on.
/DTR (ER)	DTR (ER)	: Data Terminal Ready Turns ON when the device is able to send and receive.
/DSR (DR)	DSR (DR)	: Data Set Ready Turns ON when the device is able to send and receive.
/RTS (RS)	RTS (RS)	: Transmission Request Instructs the device to be in transmission mode. The terminal is turned on before transmission.
/CTS (CS)	CTS (CS)	: Transmissible Indicates that the device is able to transmit. When CS is ON the device is able to receive.

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GENERAL SPECIFICATION

Product Name: ACT-IR100S

Compatibility: Fully compatible with IrDA -1.0 Physical spec. and

IrDA-1.0 protocol spec.: IrLAP, IrLMP, IAS, TinyTp, IrCOMM

Specifications of IrDA-1.0 (SIR):

Transmission Speed	9.6kbps, 19.2kbps, 38.4kbps, 57.6kbps, 115.2kbps
Communication Distance	within 100cm
Radiating Angle	±15º~±30º (±15 to ±30 degrees)
Peak Wave Length of Radiated Light	880~1050nm

Specifications of RS-232 port:

Transmission Speed	9.6kbps, 19.2kbps, 38.4kbps, 57.6kbps, 115.2kbps
Cable Length	110 - 120 cm
Connector	DB-9M (DTE) or DB-F (DCE)
Signal Definition	DTE or DCE

Power Source: 5 VDC (Stable) or 7.5 VDC (AC adapter).

Power Consumption: Active: < 80mA

Dimensions: 61mmL x 35mmW x 18mmH (2.4"L x 1.4"W x 0.7"H)

Weight: 65 gr. (2.5 Oz)

Operating Temperature: 0° C TO 60° C

Storage Temperature: -20° C TO 85° C

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APPENDIX A: ACTiSYS IR100S TESTING/DEMONSTRATION PROCEDURE

1) Working Principle:

Many PC peripherals use serial cable to communicate with PC. They cannot talk with Infrared Devices, such as IrDA capable PC, notebooks. ACT IR-100S's aim is to make those devices into IrDA compatible product by simply connecting it to their serial port. And these devices with IR100S COM-port IrDA bridge can communicate with PC wirelessly and don't need to modify neither hardware nor software

This simply test uses two PCs, one is IrDA installed and another is not. Both Run Windows HyperTerminal Program (one of the communication accessories). You should be able to type on one keyboard and see results on another PC's screen, or transfer files between them through the infrared connection.

2) Hardware and Software Requirements:

PC#1:

HW: x386 or better PC.

ACTiSYS' IR2000B board (based on NS87108A) with IR2000L dongle, or

ACT-IR220L Com-port Adapter, connected to COM1 or COM2.

SW: WIN95/98, IrDA Driver for SIR (if using IR220L) or FIR (if using IR2000B)

HyperTerminal, IR Monitor

PC#2:

HW: x386 or better PC,

ACT-IR100S, DTE-DCE Converter, RS232 Mini Tester (Option)

DC Power Supply (5V stable source or 7.5V adapter for regulator-installed)

SW: WIN95/98, HyperTerminal

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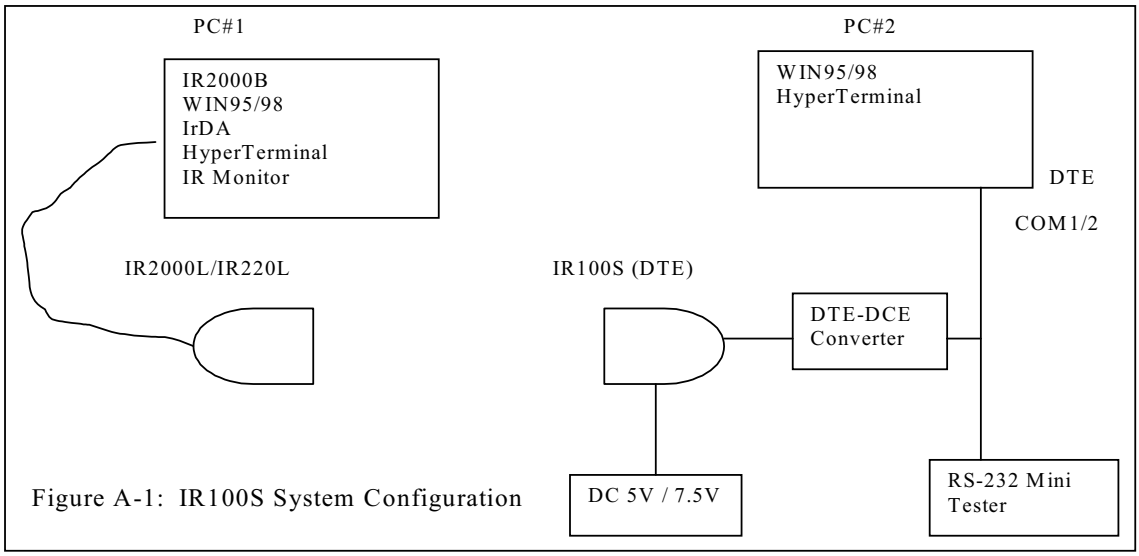

Figure A-1: IR100S System Configuration

3) Configurations:

PC#1:

Install IrDA Driver. The assigned IR virtual port must be COM4 or less, otherwise HyperTerminal will not be able to connect it

IR Monitor: Speed limit = 115.2K or lower

HyperTerminal: Connect Using -> direct to COM4 (assigned virtual port of IR)

PC#2:

100S:

R11-18 or DSW8-1: 1100, 0111

Primary/Secondary, 9.6k, Self channel setting, 8-N,

HyperTerminal: Connect Using -> direct to COM1 or COM2 (the port IR100S using)

9.6k, 8-n-1, Hardware flow-control

4) Test Procedure:

1. Connect all devices as FigA-1
2. Switch on PC#2 and the power supply of 100s.
3. Run HyperTerminal on PC#2. Set its properties according to the above configuration guide (Fig A-2 ..4).

   The LED DTR and RTS of the RS232 Mini Tester should be Red (True) when it is connected. The DTR will go to Green (False) if you disconnect it. When both DTR and RTS are True (high level) the 100S will begin discovery if you set it to Primary or Primary/Secondary. The 100S' LED will blink once every 3 seconds.
4. Switch on PC#1.

   You will see the IR Found icon and hear the sound of found IR device when windows has started. Open the IR Monitor, you will see the Status are:

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Communicating with

Name: ACTiSYS IR100S-115 (Nickname of 100s, might be different with different version)

Description: Intelligent SIR Adapter

Communication efficiency (…)

Good at 115.2 Kbps (or 57.6 Kbps. Depends on the highest speed both sides can support)

5. Run HyperTerminal on PC#1 now. Set its properties according to the above configuration guide. Click the Call icon to connect to the assigned IR port. The LED DSR and CTS of the RS232 Mini Tester on PC#2 side should turn to Red (True) when it is connected and the 100S' LED will blink once every half second.
6. Type keys on PC#1's keyboard and you should see the results will display on the remote HyperTerminal's screen. If you have got strange letters, the baud rate you set for the HyperTerminal is not the same as 100s.
7. File Transfer: Click the menu Transfer and Receive File on PC#1 …
   Click the menu Transfer and Send File on PC#2 (Fig A-5)…
   The operation is similar to use cable connection.
   The real data transfer speed depends on the lower one of IR speed and RS-232 speed. For example, the IR Speed is limited to 57.6kbps and the RS-232 speed of 100s is 9600, the effective speed (throughput) is 9570bps (Fig A-6). If the RS-232 speed set to 115.2kbps. The throughput would be around 5kbytes/Sec.

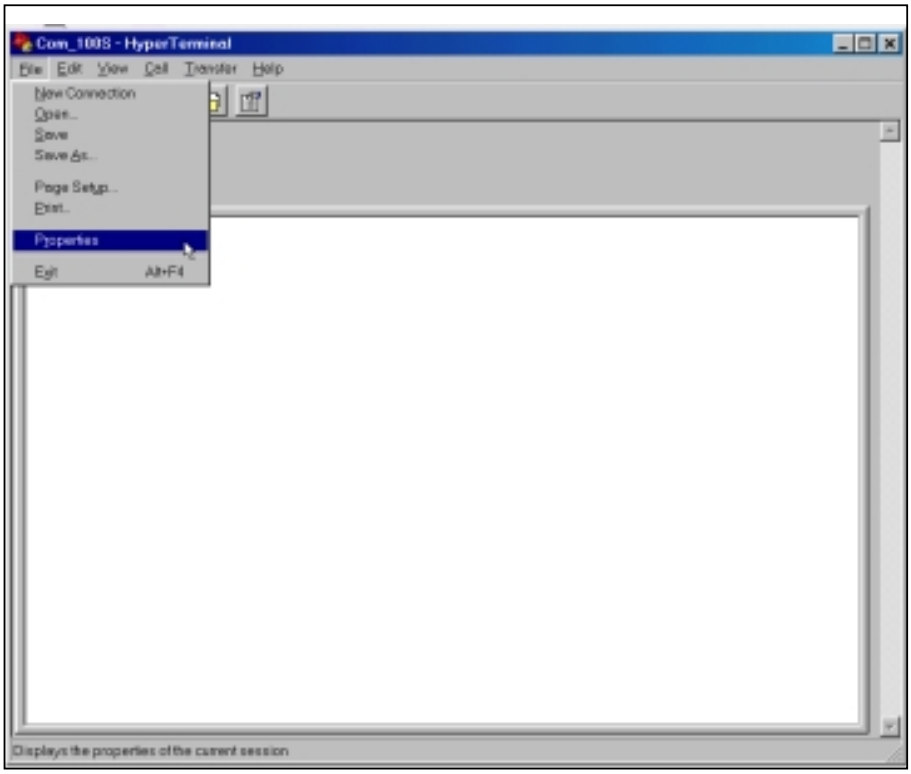

Figure A-2

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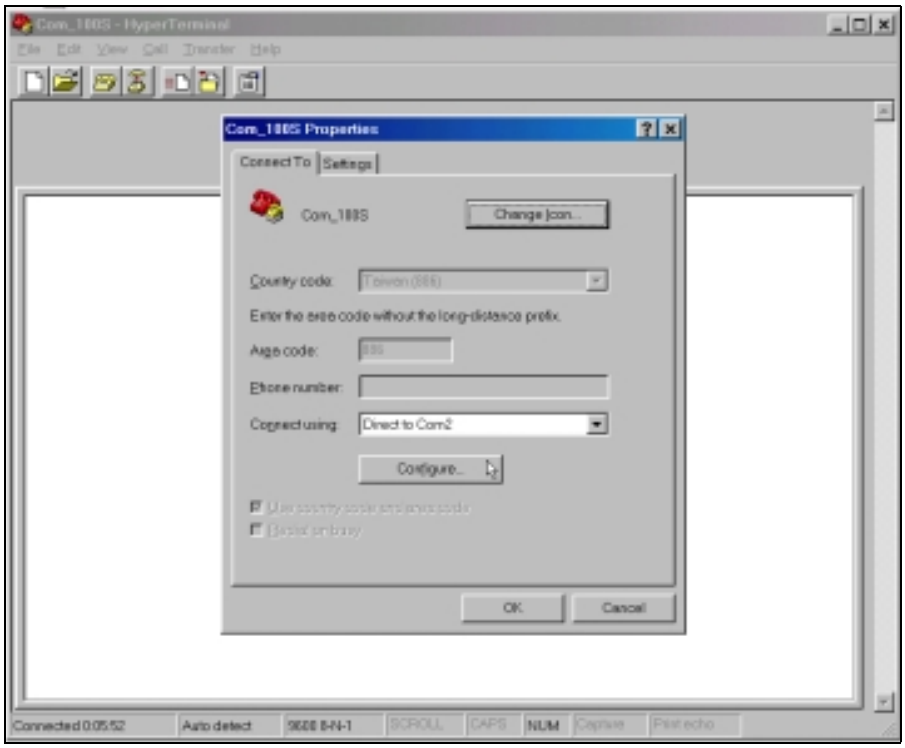

Figure A-3

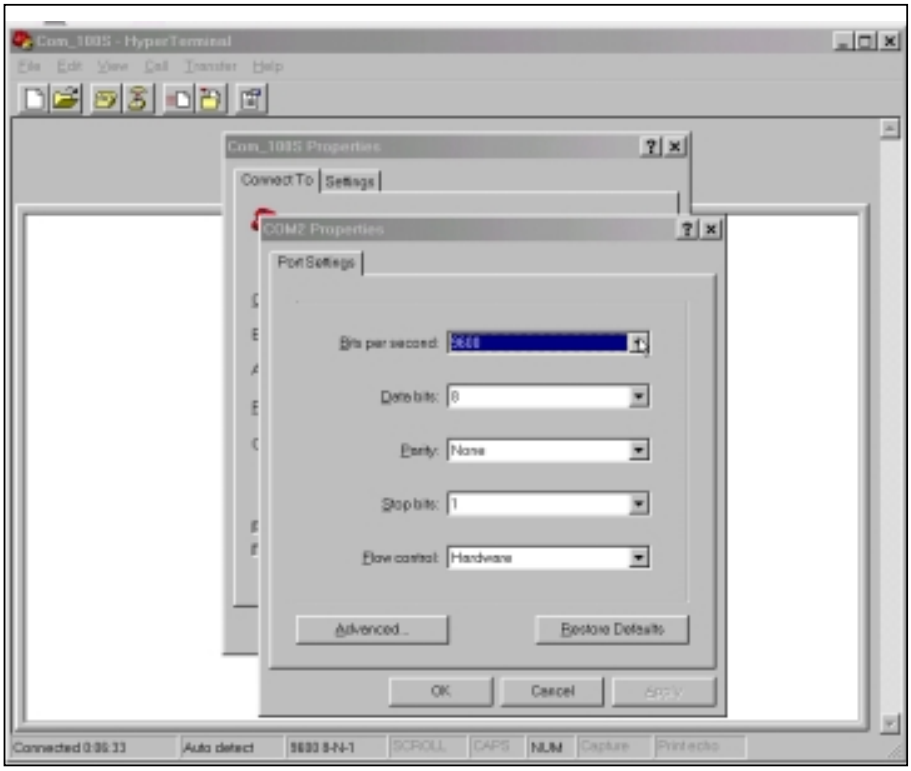

Figure A-4

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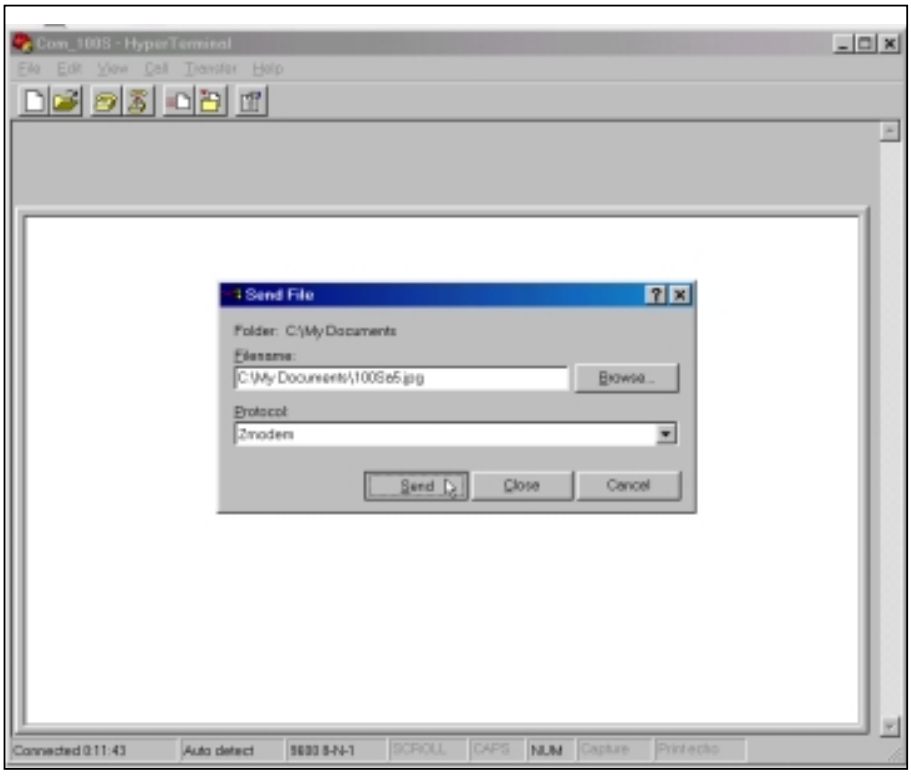

Figure A-5

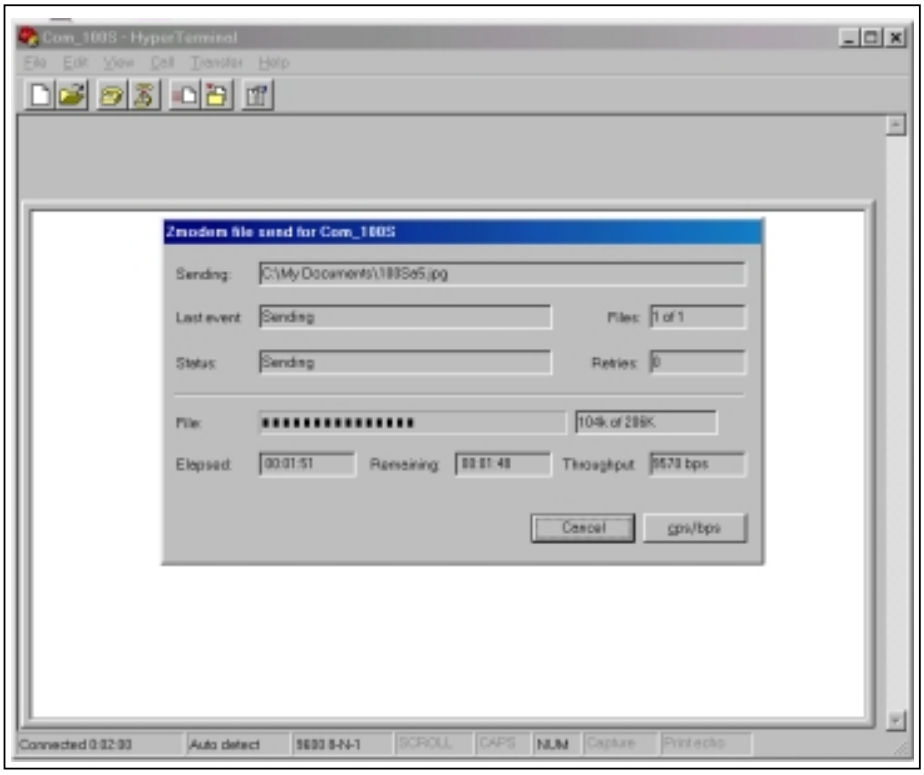

Figure A-6

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APPENDIX B: Using IR100S to convert a normal Modem into a wireless IrDA Modem

1) Working Principle:

If your device has no built-in modem and wants to connect to Internet, normally you will buy an external modem and use cable to connect them together. But some mobile devices are so small that have no RS-232 port for cable connection. Most of them have IrDA wireless built-in interface so that they can connect with an IrDA modem without cable.

One usage of ACT IR-100S is to make those normal modem into IrDA compatible product by simply connecting it to their serial port. And these devices with IR100S COM-IrDA bridge can communicate with PC or your IrDA-cable devices wirelessly and don't need to modify neither hardware nor software

This simply test uses one PC with IrDA adapter with driver installed and an external modem connected with IR100S. On PC uses 'Make New Connection' wizard of Dial-Up Networking to create a new dial-up connection to your ISP through the IR modem. It should be able to find the modem, dial phone number, establish a connection to internet and browse the web.

2) Hardware and Software Requirements:

PC:

HW: x386 or better PC.

ACTiSYS IR2000B board (based on NS87108A) with IR2000L dongle, or

ACT-IR220L Com-port Adapter, connected to COM1 or COM2.

SW: WIN95/98, IrDA Driver for SIR (if using IR220L) or FIR (if using IR2000B)

Dial-Up Networking, IR Monitor75

External Modem, IR100S, RS232 Mini Tester (Option)

DC Power Supply (5V stable source or 7.5V adapter for regulator-installed)

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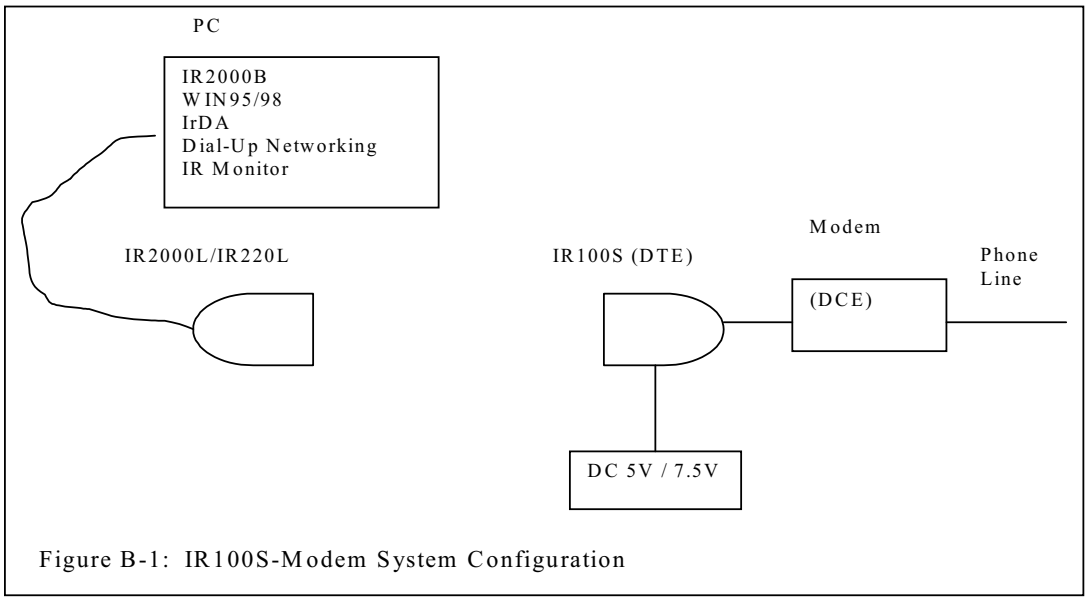

Figure B-1: IR100S-Modem System Configuration

3) Configurations:

Connect all devices as Fig B-1.

PC:

Install IrDA Driver.

Configure the Modem: (Fig B-2..6)

Port: Virtual Infrared COM Port

Maximum Speed: 115.2 Kbps

Data bits-Parity-Stop bits: 8-N-1

Use flow control: Hardware (RTS/CTS)

100S:

R11-18 or DSW8-1: 1100,0111

Primary/Secondary, 9.6k, Self channel setting, 8-N,

4) Establish a Connection:

Switch on modem and the power supply of 100s. The CTS and DSR LED on the Mini RS-232 Tester should change color from Green (False) to Red (True)

Put the two IR dongles face to face. Start up PC Win95/98 and the program IR Monitor should find IR100S device. (Fig B-8). You will see the IR Found icon and hear the sound of found IR device.

Run Dial-up network connection on PC. Set its properties according to the upper configuration guide (Fig B-2 ..6).

If a connection is established DTR and RTS are turned ON (Red, True).

Open the IR Monitor, you will see the Connection Status. (Fig B-10)

Start the connect procedure, you will see phone dialing and negotiations. (Fig B-9)

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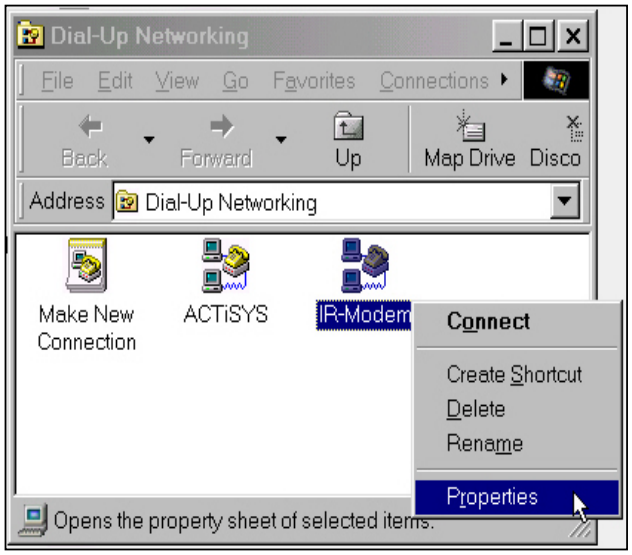

Figure B-2

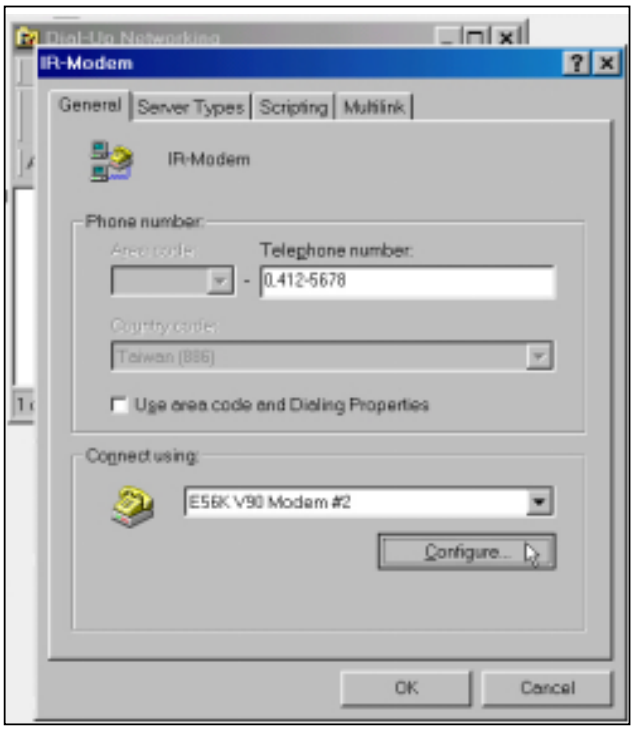

Figure B-3

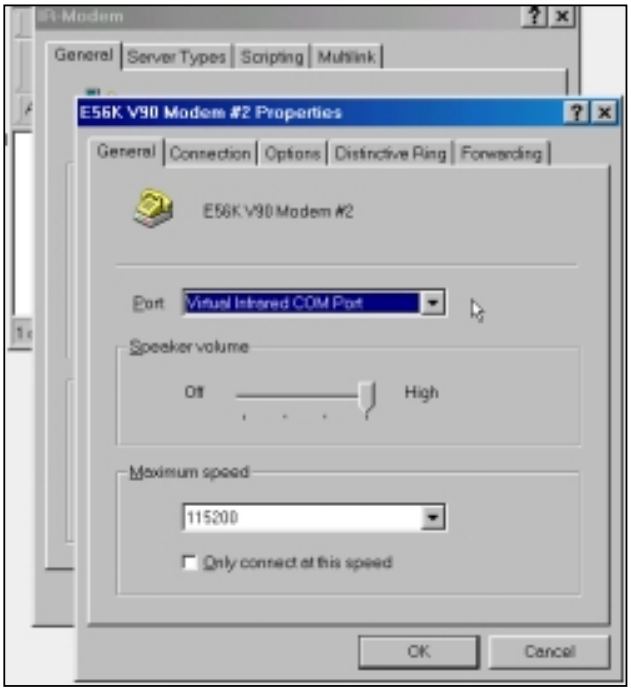

Figure B-4

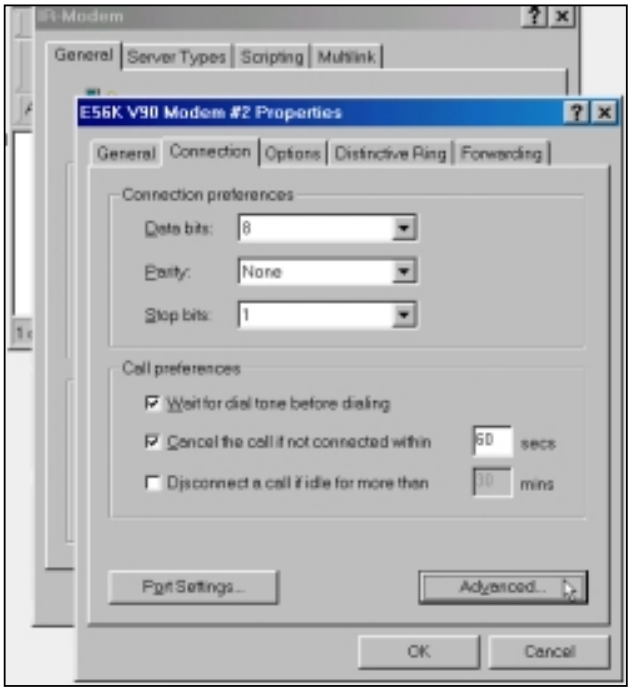

Figure B-5

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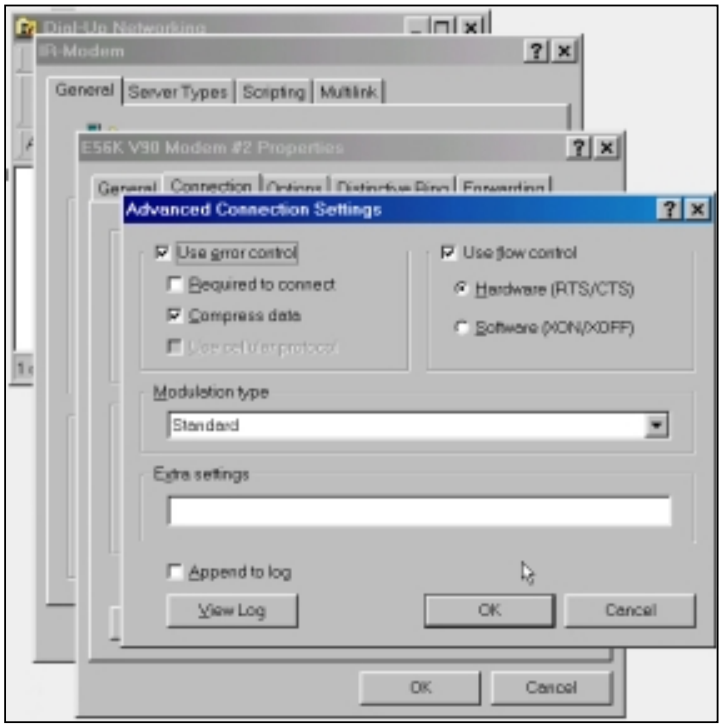

Figure B-6

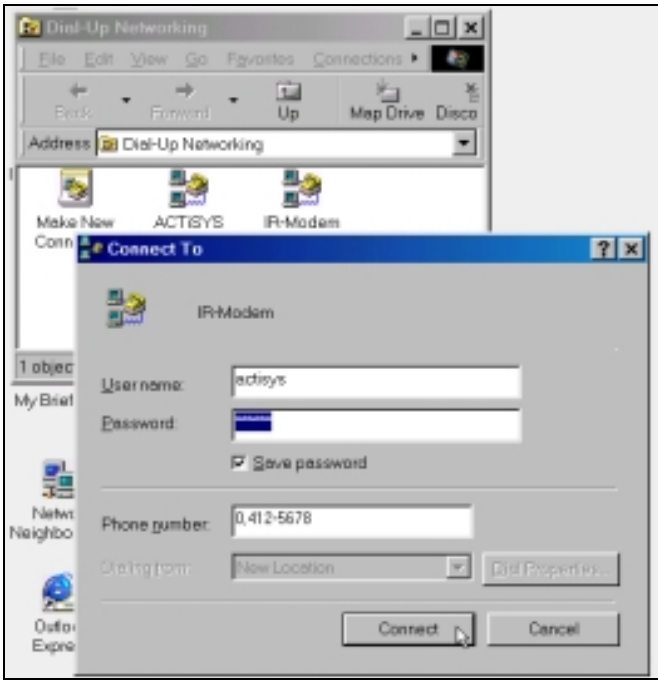

Figure B-7

Figure B-8

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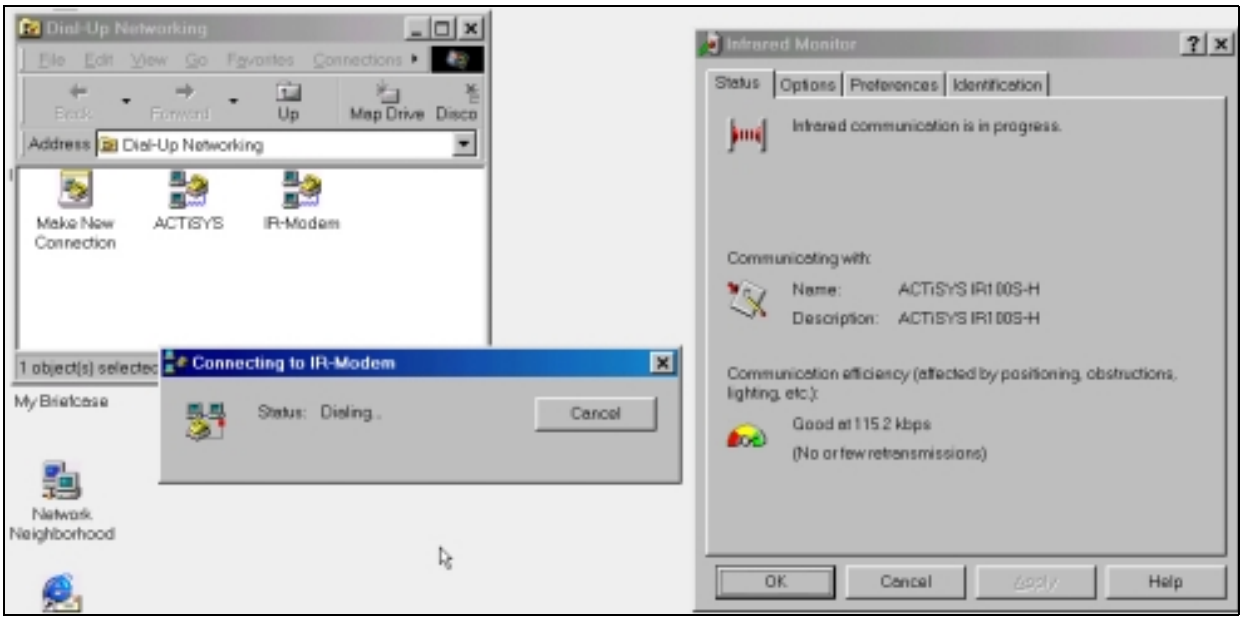

Figure B-9 Figure B-10

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OTHER ACTiSYS IrDA PRODUCTS

I (ACT-1): IrDA Primary Station Protocol Stack

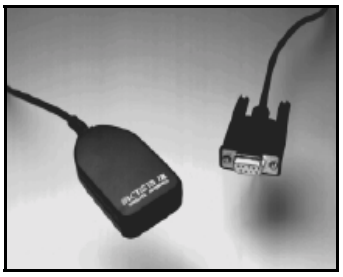
- IrLAP, IrLMP, IAS and optional Tiny TP, IrCOMM, IrMC, IrTran-P, etc.
- For PDA, digital camera, handheld data terminal, palmtop computer, smart phone.
- Very tight code, modular design, easy porting and API interface, well supported.
- Small code size (20 - 40K bytes), well tested and inter-operate with all IrDA devices.

II (ACT-2): IrDA Secondary Station Protocol Stack

- IrLAP, IrLMP, IAS and optional Tiny TP, IrCOMM, IrMC, IrTran-P, etc.
- For printer, pager, docking station, medical device, cell phone, storage devices.
- Very tight code, modular design, easy porting and API interface, well supported.
- Small code size (4 - 20K bytes), well tested and inter-operate with all IrDA devices.

100M: IrDA Printer Adapter

- Attached to and works well with any parallel printers.
- IR wireless printing directly from your IrDA devices.
- Automatic switch between mobile IR and desktop cable-based printing.
- LED indicate transmission speed and printing status.



220L/L+: IrDA Com-Port Serial Adapter

- Connects to the serial port on any computer. No power needed!
- Data transfer wirelessly from IrDA mobile devices.
- Model already built into Windows 95, 98, 2000 IR driver.
- IR distance from 0cm-200cm with no external power!

2000U: FIR-USB Adapter

- Plugs into any desktop PC USB port.
- Gives you the full IrDA speeds from 9.6K to 4M bps.
- Meets both USB 1.1 and IrDA 1.1 specification.
- Bundled with drivers for Windows 98 and Windows 2000.
- USB bus-powered, requires no external power supply.

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ACTiSYS Corporation warrants to the first consumer purchaser, for a period of 1 year from the date of purchase, that this wireless interface (The Product? Will be free from defective workmanship and materials, and agrees that it will, at its option, either repair the defect or replace the defective Product or part thereof at no charge to the purchaser for parts or for labor.

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In order to enforce the rights under this limited warranty, the purchaser should mail, ship, or carry the Product, together with proof of purchase, to ACTiSYS .

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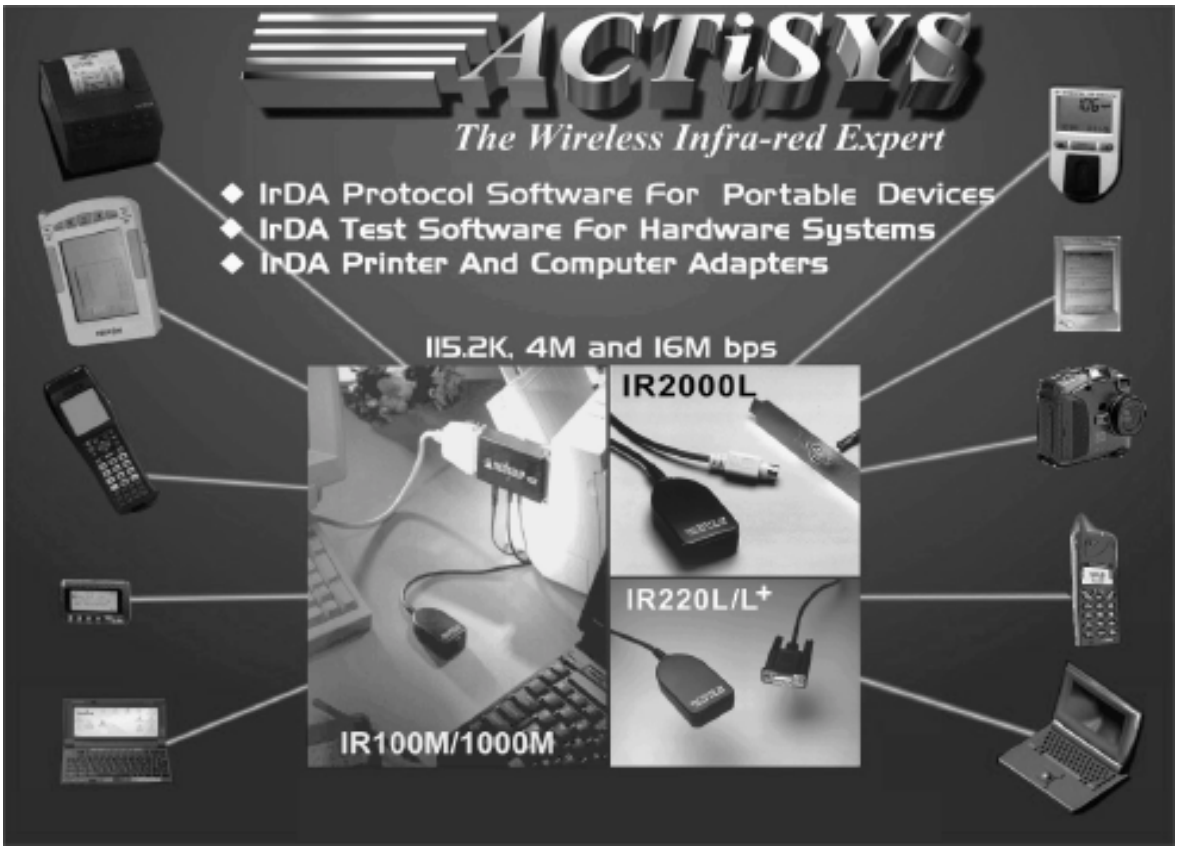

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